CLAIMS

We claim:

1. A method of using magnetic particles to concentrate or harvest cells, comprising the steps of:

(a) combining a solution with cells contained therein with magnetic particles, under conditions wherein the cells form a complex with the magnetic particles; and

(b) isolating the complex from the solution by application of magnetic force.

2. The method of claim 1, wherein the solution with cells contained therein is growth medium with a culture of bacteria suspended therein.

3. The method of claim 1, wherein the cells are blood cells.

4. The method of claim 3, wherein the cells are mammalian white blood cells and the solution with cells contained therein is whole blood.

5. The method of claim 1, wherein the magnetic particles are silica magnetic particles.

6. The method of claim 1, wherein the magnetic particles are pH-dependent ion exchange magnetic particles.

7. The method of claim 6, wherein the pH dependent ion exchange magnetic particles are selected from the group consisting of glycidyl-histidine modified silica magnetic particles, and glycidyl-alanine modified silica magnetic particles.

8. A method of clearing a solution of disrupted biological material, according to steps comprising:

(a) providing a solution comprising a disrupted biological material;

(b) combining the solution with second magnetic particles under conditions wherein the disrupted biological material forms a complex with the second magnetic particles; and

(c) separating the complex from the solution by application of magnetic force.

9. The method of claim 8, wherein the disrupted biological material is a bacterial cell lysate.

10. The method of claim 8, wherein the disrupted biological material is a homogenate of mammalian tissue.

11. The method of claim 8, wherein the disrupted biological material is a lysate of blood.

12. The method of claim 11, wherein the disrupted biological material is a lystate of mammalian white blood cells isolated from whole blood.

13. The method of claim 8, wherein the second magnetic particles are silica magnetic particles.

14. The method of claim 8, wherein the second magnetic particles are second pH dependent ion exchange magnetic particles.

15. The method of claim 14, wherein the second pH dependent ion exchange magnetic particles are selected from the group consisting of glycidyl-histidine modified silica magnetic particles, and glycidyl-alanine modified silica magnetic particles.

16. The method of claim 8, wherein the method further comprises producing the disrupted biological material provided in step (a), according to the steps comprising:

combining a solution with cells contained therein with first magnetic particles, under conditions wherein the cells form a complex with the first magnetic particles;

isolating the complex from the solution by application of magnetic force; and

disrupting the cells.

17. The method of claim 16, wherein the first magnetic particles are silica magnetic particles.

18. The method of claim 16, wherein the first magnetic particles are first pH-dependent ion exchange magnetic particles.

19. The method of claim 18, wherein the first pH-dependent ion exchange magnetic particles are selected from the group consisting of glycidyl-histidine modified silica magnetic particles, and glycidyl-alanine modified silica magnetic particles.

20. The method of claim 16, wherein the first magnetic particles are the same as the second magnetic particles.

21. A method of isolating a target nucleic acid from a disrupted biological material, comprising the target nucleic acid, a first non-target material, and a second non-target material, comprising the steps of:

(a) combining a solution of the disrupted biological material with first magnetic particles under conditions wherein the first non-target material forms a first complex with the first magnetic particles;

(b) separating the first complex from the solution of disrupted biological material by application of magnetic force, forming a cleared solution comprising the target nucleic acid and the second non-target material;

(c) combining the cleared solution with second magnetic particles under conditions wherein the target nucleic acid adsorbs to the second magnetic particles, forming a second complex;

(d) isolating the second complex from the cleared solution;

(e) washing the second complex by combining the second complex with a wash solution and separating the second complex from the wash solution by magnetic force; and

(f) combining the washed second complex with an elution solution, under conditions wherein the target material is desorbed from the second magnetic particles.

22. The method of claim 21, wherein the disrupted biological material is selected from the group consisting of a lysate of bacteria cells, a lysate of blood cells, and a homogenate of tissue.

23. The method of claim 21, wherein the target nucleic acid is plasmid DNA.

24. The method of claim 21, wherein the target nucleic acid is genomic DNA.

25. The method of claim 21, wherein the target nucleic acid is RNA.

26. The method of claim 21, wherein the first magnetic particles are selected from the group consisting of: silica magnetic particles, and pH-dependent ion exchange magnetic particles.

27. The method of claim 21, wherein the second magnetic particles are selected from the group consisting of: silica magnetic particles, and pH-dependent ion exchange magnetic particles.

30. The method of claim 21, wherein the first non-target material comprises cell debris or homogenized tissue and a precipitate, wherein the precipitate is of material selected from the group consisting of proteins, non-target nucleic acids, and lipids.

31. The method of claim 21, wherein the second non-target material remains in solution when the target nucleic acid is adsorbed to the second magnetic particles in step (c).

32. A kit for isolating a target nucleic acid from a disrupted biological material, comprising:

a first container of first magnetic particles with the capacity to form a first complex with first non-target material in a first solution of disrupted biological material comprising the first non-target material and the target nucleic acid; and

a second container of second magnetic particles with the capacity to form a second complex with the target nucleic acid, under solution conditions designed to promote the specific adsorption of the target nucleic acid to the second magnetic particles.

33. The kit of claim 32, wherein the first magnetic particles, the second magnetic particles, or both the first and second magnetic particles are silica magnetic particles.

34. The kit of claim 32, wherein the first magnetic particles, the second magnetic particles, or both the first and second magnetic particles are pH-dependent ion exchange particles.

35. The kit of claim 32, further comprising a wash solution, configured for use in washing the second complex prior to desorption of the target nucleic acid therefrom.

36. The kit of claim 33, further comprising an elution solution, configured to promote desorption of the target nucleic acid from the second complex.